

# Kenneth Andrews

Written by Administrator

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- Curriculum Vitae:
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## Education

- B.S., Applied Physics, California Institute of Technology(Caltech), Pasadena, CA, 1990
  - Ph.D., Electrical Engineering, Cornell University, Ithaca, NY, 1999
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## Research Interests

- Design of modern error correcting codes, including low-density parity-check (LDPC) codes and turbo codes
  - Design and implementation of high performance telecommunications algorithms, including error correcting encoders and decoders, and radio receivers
  - Planetary radar for characterization of near-Earth asteroids, the inner planets, and their moons.
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## Projects

- Implementation of high speed radio receivers and LDPC decoders in Verilog on FPGAs. These implementations range from early prototypes through ground implementations for the Deep Space Network and flight implementations for various spacecraft.
  - International standardization of spacecraft telecommunications systems with the
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Consultative Committee for Space Data Systems.

- Subsystem engineer for the Goldstone Solar System Radar project. The team aims to grow the existing radar system into a robust scientific instrument that regularly images near-Earth asteroids with about 4 meter/pixel resolution.
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Professional Experience

- Jet Propulsion Laboratory (1999-present)
  - Altadena Instruments (1990-1994)
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Selected Publications

1. Jeff B. Berner and Kenneth S. Andrews, "Deep Space Network Turbo Decoder Implementation", 2001 IEEE Aerospace Conference, March 10-17, 2001 (Big Sky, Montana).
2. Jeff B. Berner, Kenneth S. Andrews, Scott H. Bryant, "Deep Space Network Turbo Decoder Implementation", 2nd ESA Workshop on Tracking Telemetry and Command Systems for Space Applications (TTC 2001), October 29-31, 2001 (Noordwijk, The Netherlands).
3. Kenneth Andrews, Valerie Stanton, Samuel Dolinar, Victor Chen, Jeff Berner, and Fabrizio Pollara, "Turbo-Decoder Implementation for the Deep Space Network," IPN Progress Report 42-148, October-December 2001, pp. 1-20.
4. Kenneth Andrews, Sam Dolinar, and Fabrizio Pollara, "LDPC Decoding Using Multiple Representations", International Symposium on Information Theory (ISIT), June 30 - July 5, 2002, Lausanne, Switzerland, pg. 456.
5. K. Andrews, D. Lee, F. Pollara, and M. Srinivasan, "Performance Comparison of Selected Bandwidth-Efficient Coded Modulations", IPN Progress Report 42-151, November 15, 2002, 19 pages.
6. V. Vilnrotter, C.-W. Lau, M. Srinivasan, R. Mukai, and K. Andrews, "An Optical Array Receiver for Deep-Space Communication through Atmospheric Turbulence," IPN Progress Report 42-154, August 15, 2003.
7. G. Lui, K. Tsai, Z. Ye, S. Dolinar, and K. Andrews, "Coded Performance of A Higher Order GMSK Communication System", MILCOM, 13-16 Oct 2003, paper #338, pp. 36-40.
8. Zhong Ye, Sam Dolinar, and Kenneth Andrews, "Coded Modulation System Performance under Adjacent Channel Interference (ACI) and non-linear Satellite Communications Channels", MILCOM 03
9. V. Vilnrotter, C.-W. Lau, M. Srinivasan, R. Mukai, K. Andrews, "An Optical Array Receiver for Deep-Space Communications through Atmospheric Turbulence", 10th International Space Conference of Pacific-basin Societies (ISCOPS), Tokyo, Dec. 10-12, 2003.
10. V. Vilnrotter, K. Andrews, C. Lau, M. Srinivasan, "Conceptual Design of an Optical Array Receiver, with Preliminary Experimental Results", IPN Progress Report 42-156, Feb. 15, 2004.
11. Jason Kwok-San Lee, Benjamin Lee, Jeremy Thorpe, Kenneth Andrews, Sam Dolinar, Jon Hamkins, "A Scalable Architecture of a Structured LDPC Decoder", ISIT 2004, Chicago, pg.

292.

12. K. Andrews, J. Thorpe, and S. Dolinar, "Methodologies for Designing LDPC Codes Using Photographs and Circulants", ISIT 2004, Chicago, pg. 238.
13. S. Dolinar and K. Andrews, "Low-Density Mirror-Concatenated (LDMC) Codes: A Generalization of Irregular Repeat-and-Accumulate (IRA) Codes", ISIT 2004, Chicago, pg. 506.
14. J. B. Berner, S. H. Bryant, K. S. Andrews, "Future Capabilities for the Deep Space Network", 8th International Conference on Space Operations (SpaceOps), May 17-21, 2004, Montreal.
15. K. Andrews, S. Dolinar, D. Divsalar, J. Thorpe, "Design of Low-Density Parity-Check (LDPC) Codes for Deep Space Applications", IPN Progress Report 42-159, November 2004.
16. V. A. Vilnrotter, C. Lau, M. Srinivasan, K. Andrews, A. Portillo, "Two-element Optical Array Receiver Development: Experimental Results", SPIE LASE 2005 (San Jose), Jan. 25-26, paper 5712-29.
17. K. Andrews, S. Dolinar, J. Thorpe, "Encoders for Block-Circulant LDPC Codes", ISIT (Adelaide, Australia), Sept 4-9, 2005.
18. V. Vilnrotter, C.-W. Lau, K. Andrews, M. Srinivasan, "Two-Element Optical Array Receiver Concept Demonstration", IPN Progress Report 42-161, May 15, 2005.
19. V. Vilnrotter, C.-W. Lau, M. Srinivasan, K. Andrews, R. Mukai, "Optical Array Receiver for Communication through Atmospheric Turbulence", IEEE Journal on Lightwave Technology, April 2005, pp. 1664-1675. <http://jlt.osa.org/abstract.cfm?id=83923>
20. Dolinar and Andrews, "Compound Pulse Position Modulation Codes", ISIT (Seattle), July 6-12, 2006.
21. V. Vilnrotter, C.-W. Lau, K. Andrews, P. Vo, M. Srinivasan, D. Lee, "Two-Element Optical Array Receiver Field Demonstration", IPN Progress Report 42-165, May 15, 2006.
22. Vilnrotter, Lau, Andrews, Vo, Srinivasan, Lee, "Real-time combining of optical array signals", paper 6105-06, SPIE Photonics West (San Jose), Jan. 21-26, 2006.
23. K. Andrews, J. Gin, N. Lay, K. Quirk, M. Srinivasan, "Real-Time Wideband Telemetry Receiver Architecture and Performance", IPN Progress Report 42-166, August 15, 2006.
24. Sam Dolinar and Kenneth Andrews, "Performance and Decoder Complexity Estimates for Families of Low-Density Parity-Check Codes", IPN Progress Reports 42-168, February 15, 2007.
25. K. Andrews, D. Divsalar, S. Dolinar, J. Hamkins, C. Jones, and F. Pollara, "The Development of Turbo and LDPC Codes for Deep Space Applications", Proceedings of the IEEE, Nov. 2007, pp. 2142-2156.
26. Jones, Andrews, Dolinar, Divsalar, Zhang, Ryan, "Functions and Architectures for LDPC Decoding", IEEE Information Theory Workshop (Lake Tahoe, CA), Sept. 2-6, 2007, pp. 577-583.
27. Andrews, Divsalar, Dolinar, Pollara, "Radiation Tolerant Memories", Fifth International Planetary Probe Workshop (IPPW-5), June 23-29, 2007 (Bordeaux).
28. Jesus M. Perez, Kenneth Andrews, "Low-Density Parity-Check Code Design Techniques to Simplify Encoding", IPN Progress Report 42-171, Nov. 2007.
29. Sarah L. Sweatlock, Sam Dolinar, and Kenneth Andrews, "Buffering for Variable-Iterations LDPC Decoders", Information Theory and its Applications (San Diego, CA),

1/27-2/1/2008.

30. Andrews, Divsalar, Dolinar, Hamkins, Pollara, "Design and Standardization of Low-Density Parity-Check Codes for Space Applications", SpaceOps 2008, May 12-16, Heidelberg, Germany.
31. Cheng, Lyubarev, Nakashima, Andrews, Lee, "Integrated Performance of Next Generation High Data Rate Receiver and AR4JA LDPC Codec for Space Communications", SpaceOps 2008, May 12-16, Heidelberg, Germany.
32. Dolinar, Andrews, Pollara, Divsalar, "The Limits of Coding with Joint Constraints on Detected and Undetected Error Rates", ISIT (Toronto), July 6-11, 2008.
33. Dolinar, Andrews, Pollara, Divsalar, "Bounded Angle Iterative Decoding of LDPC Codes", Milcom (San Diego), Nov. 17-19, 2008.
34. Dolinar, Andrews, Pollara, Divsalar, "Bounds on Error Probability of Block Codes with Bounded-Angle Maximum-Likelihood Incomplete Decoding", International Symposium on Information Theory and its Applications (ISITA), (New Zealand), Dec. 7-10, 2008.
35. Dariush Divsalar, Sam Dolinar, Christopher R. Jones, Kenneth Andrews, "Capacity-Approaching Protograph Codes", IEEE Journal on Selected Areas in Communications (JSAC), Vol. 27, No. 6, August, 2009, pp. 876-888.
36. Kenneth Andrews, Jon Hamkins, Shervin Shambayati, Victor Vilnrotter, "Telemetry-Based Ranging", IEEE Aerospace Conference, Big Sky, March 6-13, 2010.
37. V. Vilnrotter, K. Andrews, J. Hamkins, A. Tkacenko, "Maximum Likelihood Estimation of Navigation Parameters from Downlink Telemetry", IEEE Aerospace Conference, Big Sky, March 6-13, 2010.
38. Lay, Lyubarev, Tkacenko, Srinivasan, Andrews, Finley, Goodhart, Navarro, "Software Receiver Processing for Deep Space Telemetry Applications", IPN Progress Report 42-180, Feb. 2010, published 5/11/2010.
39. Andrews, Argueta, Lay, Lyubarev, Sigman, Srinivasan, Tkacenko, "Reconfigurable Wideband Ground Receiver Hardware Description and Laboratory Performance", IPN Progress Report 42-180, Feb. 2010, published 5/11/2010.
40. Vilnrotter, Andrews, Tkacenko, Hamkins, "Optimal Estimators of Doppler and Delay for Deep-Space Navigation Applications", ISCOPS (Montreal), July 27-30, 2010. Final paper submitted 8/31/10.